

**REMARKS:**

**Summary of Remarks**

Applicant has cancelled Claims 1-3 and replaced them with Claims 4-6 in order to emphasize specific novel features. Claims 4 and 5 are apparatus claims while Claim 6 is a method claim. Applicant has re-stated claims below emphasizing the relevant features of invention as stated in specification that show the patentable features over Ferguson and describe how one skilled in the art would not find it obvious, through a combination of what Ferguson and Witler teach, to arrive at Applicant's invention.

The Office Action rejected Claims 1-3 under 35 U.S.C 103(a) as being unpatentable over Ferguson (US Patent No. 6,146,283) in view of Witler (US Patent No. 5,486,002).

1. Office Action failed to mention that Ferguson as well as Witler and Eccher do not teach, “**an impact sensor responsive to the collision of the rolling golf ball with the strike plate**”.

Office Action notes that Ferguson does not teach the following: “An impact of a rolling golf ball, impact absorbing material, a Doppler measurement sensor and associated circuitry, a microcontroller to receive Doppler signals and determine potential putting distance based on a rolling golf ball.” In this recitation, Office Action did not mention “**an impact sensor responsive to the collision of the rolling golf ball with the strike plate**”. The net optionally used by Witler (col. 9, lines 27-30) equated by Office Action to “impact absorbing material” of Applicant’s invention, does not contain an impact sensor. Neither Witler nor Eccher make use of an impact sensor that signals the end of the golf ball’s flight. Both Witler and Eccher position the Doppler measurement sensor on the ground beside the golf ball with the microwave beam directed towards the target net in parallel with

the golf ball's intended flight. Thus, the Doppler measurement sensor of Witler and Eccher illuminates the golf ball as it travels away from the sensor. An acoustic or optical trigger sensor (Witler) or microphone (Eccher) senses the impact of the golf club with the ball which signals the start of the measurement process. As opposed to Witler and Eccher, Applicant's invention is placed at the destination of the golf ball's roll, with the Doppler measurement sensor illuminating the golf ball as it rolls towards the strike plate. In other words, in Applicant's Invention, the ball rolls towards the sensor, not away from it. Thus, in Applicant's invention, the Doppler measurement sensor signal gets larger as the ball rolls closer to the strike plate. As described in the Specification, Applicant's invention is placed approximately two feet away from the golf ball's starting position. This close proximity of the golf ball to the strike plate coupled with the Doppler sensor signal increasing as the ball gets closer to the device allows for a very low powered and inexpensive (\$5) Doppler measurement sensor to be used over the high powered and expensive Gunn device (\$100) as used by Eccher and does not require a PLL to track the signal and cover signal drop-outs. In addition, in Applicant's invention, the last 8 cycles measured before impact are reliable, not subject to drop-outs, and are representative of the rolling golf ball only. As opposed to Witler, who counts Doppler pulses during a gated time interval, applicant's Doppler measurement process consists of measuring the period of every cycle of the Doppler measurement signal and placing each period measurement in a circular memory buffer. Hence, in Applicant's invention, the microcontroller is always measuring any signal that it sees regardless of whether it is a putter head, the golfer taking his/her stance, or the rolling golf ball. All of these signals are measured cycle by cycle and placed into a circular memory buffer. Applicant's invention does not require the detection of the putter striking the golf ball to start the Doppler signal measurement process. Only when an impact of the rolling golf ball with the strike plate occurs does the impact sensor signal the microcontroller to stop measuring Doppler signal periods. The

microcontroller then begins at the most recently written buffer location and working backwards takes the last  $n/2$  samples in the circular buffer where  $n$  is the length of the circular buffer. These  $n/2$  samples represent the speed measurements of the rolling golf ball just prior to impact with the strike plate. The start of the speed measurement process commences immediately upon power up and continues indefinitely until the impact sensor notifies the microcontroller of the end of the golf ball's roll. After the speed estimate is complete and a roll distance estimated and presented to the golfer, the microcontroller resumes the measuring and storing of Doppler signal periods in the circular memory buffer until another impact event occurs.

The start for Witler and Eccher is detection of the golf club's impact with the ball while the end is established when the microcontroller determines if the signal acquired was valid, PLL was locked, and the range limits (for the club selected) was valid.

Based on the above, it is clear that Applicant's invention is novel and unobvious for the variety of reasons just described.

**2. The Ferguson and Witler prior-art references do not contain any suggestion (expressed or implied) that they be combined, or that they be combined in the manner suggested. In fact, Witler and Eccher explicitly exclude putting distance estimation from their patents.**

Ferguson mentions an odometer and does not mention a Doppler Microwave Sensor as an alternative putting force signal source nor does Witler mention estimating putting distance with a Doppler Microwave Sensor. Eccher, (in col. 9. lines 13-18) specifies the velocity of a golf ball ranging from 15 to 320 miles per hour. Eccher states: "Values outside of this range are assumed to be meaningless and will be ignored." Typical putts of from 3-25 feet (commonly practiced by golfers) would have an initial speed of approximately 5-15 miles per hour. Therefore, golf ball speeds commensurate with most putting are ignored by

Eccher which indicates no intent for Pat No. 5,246,232 to teach estimation of putting roll distance.

Witler specifically excludes the putter from the possible list of clubs that can be selected prior to striking the golf ball. In (col. 14. lines 30-35), Witler states "...to allow any club in a golf bag with the exception of a putter to be used". The purpose of Witler's golfing apparatus (as well as Eccher) is for estimating the carry distance of a struck golf ball. A putter imparts a roll on a golf ball and carry distance is irrelevant. The physics of rolling golf balls is quite different from the physics of golf balls flying in the air. Witler makes no suggestion of estimating roll distance. Witler and Eccher do not teach that the golf ball be "preferably placed on carpeted floor comprised of short fibers to provide a fast true roll" as Applicant has stated in the Specification. A fast surface implies negligible friction such that the golf ball arrives at the strike plate at approximately the same speed that it began rolling with.

## **CONCLUSION**

For all of the above reasons, applicant submits that the invention is novel and that claims now define patentability over prior art. Therefore applicant submits that this application is now in condition for allowance, which action Applicant respectfully solicits.

## **Conditional Request For Constructive Assistance**

Applicant has amended the claims of this application so that they are proper, definite, and define novel structure which is also unobvious. If, for any reason this application is not believed to be in full condition for allowance, applicant respectfully requests the constructive assistance and suggestions of the Examiner pursuant to M.P.E.P. 2173.02 and 707.07(j) in order that the undersigned can place this application in allowable condition as soon as possible and without the need for further proceedings.

Very respectfully,



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